

REMARKS

Claim 49 has been amended to add the phrase “the steps of.” Claim 49 has also been amended to add the phrase “allowing regrowth of the cartilaginous material.” Support for this claim amendment can be found in the specification of the captioned application on page 1, line 36 through page 2, line 2 and page 13, lines 1-21, and in the specification of application serial number 08/628,773 (see page 1, line 36 through page 2, line 2 and page 10, line 22 through page 11, line 12), filed on April 5, 1996, the earliest application to which the captioned application claims priority.

The Examiner has rejected claims 49-52 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,782,915 (Stone) or U.S. Patent No. 4,585,458 (Kurland) in view of U.S. Patent No. 5,711,969 (Patel). Thus, the Examiner effectively rejected claims 49-52 under 35 U.S.C. § 103(a) over Stone in view of Patel or over Kurland in view of Patel. The rejections based on these two combinations of references are discussed separately below.

The Examiner indicates that Stone discloses a method of removing the cartilage of a joint down to the bleeding bone bed to create a defect site as claimed and teaches covering the defect site with a tissue graft, the Examiner concedes that Stone fails to disclose using a 4 to about 200 layer submucosa tissue graft as claimed. However, the Examiner contends that it would have been obvious to use the 8-layer submucosa grafts described in Patel in the method taught in Stone because the 8-layer grafts have superior strength and ingrowth capabilities as taught by Patel. Applicants respectfully traverse the Examiner’s rejection of claims 49-52 under 35 U.S.C. § 103(a). Amended claims 49-52 are not obvious over Stone in view of Patel.

Applicants’ amended claims 49-52 are directed to a method of reconstructing a joint having two bones separated by cartilage by removing a portion of the cartilage to create a defect site, positioning an anatomically shaped reconstructive structure comprising 4 to about 200 layers of submucosa tissue adjacent to the defect site, securing the reconstructive structure to the defect site, and allowing regrowth of the cartilaginous material.

Claims 49-52 have been amended to specify the additional step of “allowing regrowth of the cartilaginous material” to clarify that the claimed method involves the regeneration of endogenous host tissues using submucosa graft constructs.

As stated in MPEP § 2143 titled “Basic Requirements of a *Prima Facie* Case of Obviousness,”

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations.

MPEP § 2143. Applicants contend that none of the three basic criteria required to establish a *prima facie* case of obviousness have been met for the rejection over Stone in view of Patel or over Kurland in view of Patel.

First, as stated in MPEP § 2143.01, “[o]bviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988); *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992).” MPEP § 2143.01.

The submucosa graft constructs described in Patel, are delaminated graft constructs that are, at least in part, decellularized, and provide a scaffolding to which endogenous host cells are attracted. The endogenous host cells migrate to the graft construct and remodel (*i.e.*, regenerate) host tissues at the site of implantation of the graft construct to repair diseased or damaged tissues. As stated in Patel, the submucosal graft constructs “serve as a matrix for the regrowth of the tissues replaced by the graft constructs” (see column 1, lines 26-29).

In contrast to Patel, Stone teaches a method for the repair of articular cartilage using a heterograft obtained by removing native, intact articular cartilage from the joint of an animal. The heterograft is applied to the bleeding bed of a patient's joint and is secured to the joint. Thus, Stone teaches the use of native, intact articular cartilage in the method described in Stone (see column 3, lines 44-48 and column 4, lines 1-3). Furthermore, Stone teaches (column 4, lines 14-18) that the degradation of the articular cartilage used as a heterograft material should be minimized. Thus, Stone teaches that native, intact articular cartilage should be used in the method described in Stone unlike the delaminated, decellularized graft constructs described in Patel.

Moreover, Stone teaches that graft constructs of the type described in Patel should not be used in the method described in Stone. Stone states, in reference to methods that require the migration of chondrocytes to a joint followed by regeneration of cartilage tissue, that "the amount of cartilage formed by these procedures is generally not adequate to replace severely damaged joint surfaces in vivo" (see column 1, lines 21-29). Furthermore, Stone states, in reference to methods of surgical intervention that involve cartilage regeneration, that the regenerated tissue is "usually temporary and inadequate to withstand the normal joint forces" (see column 1, lines 30-37).

Thus, Stone teaches a method for the repair of articular cartilage using native, intact articular cartilage, and Stone teaches that any method that requires migration of endogenous cells (*e.g.*, chondrocytes) to the joint followed by regrowth of endogenous cartilage tissue to repair diseased or damaged tissue should not be used. As discussed above, endogenous host cells migrate to the site of implantation of the submucosa graft constructs described in Patel, and the graft constructs serve as a matrix for the regrowth of endogenous tissue (see column 1, lines 26-29). Accordingly, rather than providing motivation to combine the teachings of Stone and Patel, Stone clearly teaches that any graft construct, such as the construct described in Patel, that requires regrowth of endogenous cartilage tissue to repair diseased or damaged tissue should not be used. Moreover, based on the teachings of Stone,

there is an expectation of being unsuccessful when graft constructs, such as those described in Patel, are used in the method of Stone (*i.e.*, regenerated tissue is inadequate to withstand the normal joint forces according to Stone).

Lastly, as stated in MPEP § 2143.03, “[t]o establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974).” MPEP § 2143.03. Amended claims 49-52 specify the step of “allowing regrowth of the cartilaginous material.” As discussed above, Stone teaches away from methods requiring regrowth of endogenous cartilage tissue to repair diseased or damaged tissue. Patel does nothing to overcome the insufficiencies of Stone. In fact, Patel describes a graft construct that has the very properties that Stone teaches are ineffective for the repair of damaged cartilage tissue. Thus, rather than teaching all of the limitations of Applicants’ claims, the combination of Stone and Patel teaches away from the method specified in amended claims 49-52, and the subject matter of amended claims 49-52 cannot be obvious over the combination of Stone and Patel. Withdrawal of the rejection of claims 49-52 under 35 U.S.C. § 103(a) over Stone in view of Patel is respectfully requested.

The Examiner rejected claims 49-52 under 35 U.S.C. § 103(a), in the alternative, as being unpatentable over Kurland in view of Patel. The Examiner contends that Kurland teaches Applicants’ claimed method for repair of cartilage, but does not teach the graft construct specified in Applicants’ claims, and that Patel teaches that it was known to repair connective tissue with an 8-layer thick submucosa graft. According to the Examiner, it would have been obvious to use the 8-layer submucosa grafts described in Patel in the method taught in Kurland because the 8-layer graft constructs have superior strength and ingrowth capabilities as taught by Patel. Applicants respectfully traverse the Examiner’s rejection of claims 49-52 under 35 U.S.C. § 103(a) over Kurland in view of Patel. Amended claims 49-52 are not obvious over Kurland in view of Patel.

There is only one reference in Kurland to repair of damaged cartilage (column 7, lines 13-25) as cited by the Examiner (see page 3, line 7 of the August 1, 2003 office action). In column 7, lines 13-25, Kurland discloses the use of a heterograft comprising native, intact cartilage on the upper surface and synthetic mesh on the lower surface of the heterograft to attach the heterograft to the underlying bone. The heterograft for cartilage repair described in Kurland (column 7, lines 13-25) is comprised of native, intact cartilage for the purpose of providing a sliding, smooth cartilaginous surface immediately upon implantation of the graft construct into the joint.

In introducing the embodiments of the invention described in column 6, line 57 through column 7, line 25 of the reference (including the embodiment related to cartilage repair), Kurland points out that the discussion in that section of the reference is directed to graft constructs that define sliding surfaces, such as the sliding, smooth cartilaginous surfaces described in column 7, lines 13-25, and not to graft constructs used for augmentation (*i.e.*, regrowth; column 6, lines 57-60). Thus, Kurland teaches that the purpose of the graft construct described in column 7, lines 13-25 of Kurland is not for the reconstruction (*i.e.*, regrowth) of cartilage, but, rather is for the repair of damaged cartilage by inserting native, intact cartilage into a defect site to provide a sliding, smooth cartilaginous surface immediately upon implantation of the graft construct into the joint.

As discussed above, Patel teaches submucosal graft constructs that are delaminated and serve as a matrix for the regrowth of the tissues replaced by the graft constructs (column 1, lines 26-29). Kurland teaches a method for the repair of articular cartilage using native, intact articular cartilage to provide a sliding, smooth cartilaginous surface immediately upon implantation. Thus, there is no motivation to combine the teachings of Kurland with Patel because Kurland discourages the use of a graft construct that promotes regrowth of tissues because the purpose of Kurland's graft construct is to provide a sliding, smooth cartilaginous surface immediately upon implantation.

Furthermore, MPEP § 2143.03 requires that to establish *prima facie* obviousness of a claimed invention, all of the claim limitations must be taught or suggested by the prior art. Applicants' amended claims 49-52 specify the step of "allowing regrowth of the cartilaginous material." Kurland teaches away from using, in the method described in Kurland, a graft construct that requires regrowth of cartilaginous tissue because Kurland teaches a method of using native, intact cartilage to provide a sliding, smooth cartilaginous surface immediately upon implantation of the graft construct into the joint. Patel describes a graft construct with the very properties that Kurland discourages so Patel does nothing to overcome the insufficiencies of Kurland. Thus, rather than teaching or suggesting all of the limitations of Applicants' claims, the combination of Kurland and Patel teaches away from Applicants' claimed invention. Accordingly, the subject matter of amended claims 49-52 cannot be obvious over Kurland in view of Patel. Withdrawal of the rejection of claims 49-52 under 35 U.S.C. § 103(a) over Kurland in view of Patel is respectfully requested.

The Examiner has also rejected claim 53 under 35 U.S.C. § 103(a) as being unpatentable over Stone in view of Patel. The arguments discussed above with respect to the rejection of claims 49-52 over Stone in view of Patel apply with equal force to this rejection. Withdrawal of the rejection of claim 53 under 35 U.S.C. § 103(a) is respectfully requested.

The Examiner also rejected claim 54 under 35 U.S.C. § 103(a) as being unpatentable over Stone in view of Kurland and Patel. The Examiner rejected this claim over Stone in view of Patel for the reasons discussed above and uses Kurland to provide the teaching of a barrier layer. Accordingly, the arguments discussed above with respect to Stone and Patel as used to reject claims 49-52 apply with equal force to this rejection. Withdrawal of the rejection of claim 54 under 35 U.S.C. § 103(a) is respectfully requested.

CONCLUSION

The foregoing amendments and remarks are believed to fully respond to the Examiner's rejections. The claims are in condition for allowance. Applicants respectfully request allowance of the claims, and passage of the application to issuance.

Respectfully submitted,



Rebecca L. Ball
Registration No. 46,535
Attorney for Applicants

RVB:gl
(317) 231-7511
Indianapolis, Indiana 46204